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Application No. 05 770 571.7 - 2122	Ref. 116 497 ajme	Date 26.06.2009
Applicant Mitsubishi Shindoh Co., Ltd.		

Communication pursuant to Article 94(3) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(2) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 126(2) and 131(2) and (4) EPC. One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (R. 50(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Art. 94(4) EPC).



von Zitzewitz, A
Primary Examiner
For the Examining Division

Enclosure(s): 6 page/s reasons (Form 2906)
translation of D1; translation of D2; D3-D6

The examination is being carried out on the **following application documents**:

Description, Pages

1-44 as originally filed

Claims, Numbers

1-13 received on 22.12.2008 with letter of 22.12.2008

Drawings, Sheets

1/2, 2/2 as originally filed

1. Amendments

1.1 With the reply dated 22.12.2008 the application was amended i.a. as follows:

I.) The additional features of original claims 2 and 3 have been introduced in present claim 3 (= original claim 1).

This amendment fulfills the requirements of article 123(2) EPC.

II.) The wording "optionally **at least**" (meaning ≥ 1 , while precisely 1 was originally defined) has been introduced in use claim 1, product claim 3 and method claim 6.

No basis can be found for this wording in the description. It is noted that all examples only disclose to add either 0 or precisely 1 optional element.

This amendment does **not** fulfill the requirements of article 123(2) EPC.

To overcome this objection, **the wording "at least" must be deleted.**

2. Preliminary objections

2.1 The set of claims is not concise (Art.84 EPC), as all features of the master alloy of claim 3 are again defined in use claim 1 (except P) and in method claim 6.

The non-unity objection between the product- and method claims has been overcome by introducing P in these claims. However, there is now a lack of unity

between **the use claims (which lack P)** and the product-claims.

To overcome these objections,

- I.) Master alloy claims 3-5 should become claims 1-3.
- II.) The use claim should read "Use of a master alloy according to claims 1, 2 or 3." and dependent use claim 2 should be deleted.
- III.) The method claim should read "A method of ... master alloy according to claims 1, 2 or 3 to said molten copper alloy ...".

3. Prior art

The following prior art is additionally introduced:

- D3: US 3,928,028
- D4: EP 1 452 612
- D5: F. Romankiewicz et al.: "Kornfeinung von Kupferlegierungen",
Metallwissenschaft und Technik, 48. Jahrgang, Nr. 11/1994, Seiten 865 -
871, XP9115894
- D6: M. Sadayappan et al.: "Grain refinement of permanent mold cast copper
base alloys", Materials Technology Laboratory Report 2004 - 6 (TR-R), April
2004, XP9115928

4. Novelty (Article 54(1,2) EPC)

4.1 The following is noted:

- I.) Any copper alloy represents "a master alloy (which is suitable) for casting a copper alloy" defined in claim 1.
- II.) The alloy of claim 1 comprises Zn only optionally, as e.g. 80% Cu and 20% Zr already represent 100%.

4.2 **D3** discloses cast Cu alloys including Zn and/or Sn to which 0.02-0.2% P and 0.02-0.2% of a transition metal being preferably Zr is added to refine the grain size (claims 1-3; abstract). Example I (col.4) discloses an alloy consisting of 70% Cu, 0.1% P, 0.03% Zr, balance Zn.

Therefore, the product of **claim 3 is not novel over D3**.

5. Inventive step (Articles 52(1) and 56 EPC)

5.1 Product claims starting from D1 in view of D2

D1 discloses Cu-Zn-Zr alloys comprising 11-40% Zn and 0.1-3% Zr, which are used for conductive wires (abstract). Example No. 7 (table 1) consists of 35% Zn, 0.5% Zr and 64.5% Cu.

The subject-matter of **claim 3 is novel** by defining the addition of **0.01-3% P** to a Cu-Zn-Zr alloy, which D1 is silent about. According to the application (par.23+29) this leads to grain refinement; thereby, the strength is increased.

D2, which same as D1 refers to the use of Cu-Zn alloys as a conductive material, discloses the optional addition of one or more of several elements including P to improve the strength (p.5, middle). E.g. table 1, example 6 discloses the addition of 0.02% P and 0.4% Mn. At the same time D2 discloses to lower the Zn-content to 0.01-5% (p.5, top), whereby the Cu-content is accordingly increased.

Starting from D1 and wishing to improve the strength of the conductive wire of D1, the skilled person would first have to neglect the teaching of D2 to decrease the Zn-content and second have to select specifically P. He has no reason to do this; especially, as example 6 - which includes P - does not have especially good properties.

Therefore, the product of **claim 3 is inventive starting from D1 in view of D2**.

5.2 Product claims starting from D1 in view of D3 respectively D4

The subject-matter of **claim 3 is novel** over D1 by defining the addition of **0.01-3% P** to a Cu-Zn-Zr alloy, which D1 is silent about.

According to the application (par.23+29) this leads to grain refinement. Starting from D1 and wishing to improve grain refinement, the skilled person is encouraged by **D3**, which same as D1 refers to conductive Cu-Zn-Zr alloys and suggests to add 0.02-0.2% P to improve grain refinement (col.2, l.48-68; abstract; claims 1-2), to add 0.02-0.2% P without inventive skill.

Starting from D1 and wishing to reduce dezincification, the skilled person would also be encouraged by **D4**, which same as D1 refers to conductive Cu-Zn-alloys

and suggests to add 0.003-0.2% P to reduce dezincification (abstract; par.27+35), to add 0.003-0.2% P without inventive skill. It is noted that D4 also suggests to add 0.5-3.5% Sn.

Therefore, the product of claim 1 is not inventive starting from D1.

The additional feature of **claim 4** is known from D1, example No. 7.

A shape falling under the scope of **claim 5** is disclosed in D1 (page 2, right column, lines 5-13).

In summary, the **product of claims 3-5 is not inventive starting from D1 in view of D3 respectively D4.**

5.3 Use claims starting from D1

The subject-matter of **claim 1 is novel** over D1 by defining to use the alloy of D1 for casting, which D1 is silent about.

This does not require inventive skill, as it is usual for the skilled person to recycle rests of formerly cast alloy ingots - which represent master alloys (see above) - by remelting them when casting further alloy ingots.

The additional feature of **claim 2** is known from D1, example No. 7 (table 1).

Therefore, the **use of claims 1-2 is not inventive starting from D1.**

5.4 Method claims starting from D1

The subject-matter of **claim 6 is novel** by defining:

- I.) the addition of **0.01-3% P** to a Cu-Zn-Zr alloy and
- II.) using this alloy for casting, which D1 is silent about.

Adding 0.01-3% P (I.) is not inventive for the reasons given in chapter 5.2; using this alloy for casting (II.) is not inventive for the reasons given in chapter 5.3.

Therefore, the method of claim 6 is not inventive starting from D1.

With regard to **claim 7**, the lower P-content suggested by D3 respectively D4 is 0.02% (= 200 ppm) respectively 0.003% (= 30 ppm).

No effect of the ratio of $0.5 < P/Zr < 150$ of **claim 8** is substantiated by the application as a whole, wherefore it cannot reason an inventive step. Further, it is obvious to come to this ratio by choosing according amounts of P and Zr according to the circumstances.

The phases defined in **claims 9-11** occur in the alloy resulting from the combination of D1 with D3 respectively D4 due to the composition and due to usual casting parameters.

With regard to **claim 12**, D1 discloses Cu-Zn as the alloy to be modified (page 4, penultimate paragraph: "Copper was melted ... Zn was added").

The alloy of **claim 13** is a mere alternative, which does not have any effect substantiated by the application as a whole; further, it is obvious by the teaching of D4.

Therefore, the **method of claims 6-13 is not inventive starting from D1**.

5.5 **D5 and D6** (e.g. page 20) are cited to show that the addition of P and Zr to Cu-Zn alloys is well known and usual to increase grain refinement.

6. Further objections

6.1 The description is not adapted to the claims (Art.84 EPC). Especially, only one example of each of tables 1-3 is understood to comprise P.

6.2 The relevant prior art D1 is not acknowledged in the description (Rule 42 EPC).

7. Filing of amended application

7.1 As a matter of precaution the Applicant is reminded that the application may be refused (Article 97(2) EPC), should any of the objections above not be overcome.

7.2 Should the Applicant wish to file amended claims, the amendments carried out

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and the passages of the application as filed, on which these amendments are based, should be clearly identified.